CONTRIBUTION No. 135

REVIEWS

EDUCATION AND RECRUITMENT OF OCEANOGRAPHERS IN THE UNITED STATES. *A report by the Committee on Education and Recruitment, American Society of Limnology and Oceanography, Inc., August 30, 1960. Limnology and Oceanography, Supplement to Volume VI. 1960.* 23 pp., 2 figs., 4 tables.

The American Society of Limnology and Oceanography and The Committee on Education and Recruitment deserve credit for recognizing and accepting their responsibility in the education and recruitment of marine scientists. The Committee reports on employment and production of oceanographers, and discusses opportunities and needs in the basic disciplines—biological, chemical, geological, and physical oceanography. The report is well written and organized and contains information of interest to all persons engaged in aquatic sciences. Copies may be obtained from Dr. George H. Lauff, Secretary-Treasurer, American Society of Limnology and Oceanography, University of Michigan, Ann Arbor, Michigan.

The mechanics of such a survey usually present many problems concerning the coverage of institutions for interview and the manipulation of resultant data. That these problems confronted the Committee is evidenced in footnote 3, page viii.

> The statistics reported in this and the following sections of the present report are neither complete nor exact. This is because of the varied nature of the institutions engaged in oceanographic work, the lack of agreement on the definitions of the various categories involved, and the different interpretations which may have been applied to the question by those who answered the questionnaires. . . . Nevertheless, the Committee believes that the numerical information presented supplies a useful indication of the manpower engaged in oceanography . . . .

I hesitate to criticize this report adversely, because (1) it includes much information of value to marine scientists, (2) of my sincere respect for the Committee members who are leaders of note in their respective fields, and (3) as a member of ASLO, I take pride in the Society's publications. To rationalize my position, I consider the subject matter of such import that the limitations and questioned areas of the report cannot be ignored.

The area of disagreement concerns data in Section III—Employment, and the use and conclusions reached from these data in subsequent sections. A major objection is the interpretation of data published in 1959 by the National Academy of Sciences–National Research Council, *Oceanography 1960 to 1970. Chapter 12—Marine Sciences in the United States—1958.* This NAS article listed 70 marine laboratories and summarized results of a survey from 60 of these, but gave no implication that personnel at the 60 institutions represented the total oceanographic working force of scientists in the United States. The ASLO article, on the other hand, accepted NAS figures for the 60 laboratories as the total working force, after apparently deducting approximately 350 visiting scientists from the NAS total of 1,548. ASLO then applied a percentage increase to the NAS figure and concluded that the 24 institutions selected for its survey represented nine-tenths of the present working force. I cannot agree that these institutions include such a high percentage or that they are representative of the distribution of the oceanographic disciplines. Many institutions were not considered, industrial laboratories were not even mentioned, and only two state fishery agencies, Alaska and Virginia, were included in the list. There are more than 20 coastal states, and at least 10 of these maintain a sizable staff of marine scientists. Biological oceanographers (ASLO definition) predominate in these fishery laboratories and, if included in the survey, could substantially change the percentage representation of the several oceanographic disciplines in the total working force. Support of this statement can be found in Carlander's paper, *A Survey of Technical Fishery Personnel* (Transactions of the American Fisheries Society, Volume 88, pages 18–22, January 1959). His 1958 data show over 1,600 technical fishery personnel in the United States, a third of which are in marine fisheries. Using the 15 percent mean annual rate of increase listed by ASLO, the number employed in marine fisheries alone during 1960 would exceed the 629 in the ASLO list in all biological oceanography.

The seriousness of this omission, in terms of percentage representation by discipline, is difficult to determine, but personal knowledge of several industrial laboratories and many of the state agencies omitted leads me to question the ASLO figures. Further, use of these figures to point out that the work force of physical oceanographers is greater than the production does not seem justified. Nor is the following undocumented statement warranted, for it suggests a preconceived notion as to the outcome of the ASLO survey. ". . . The need for strengthening this field [physical oceanography] is confirmed by the fact that there is at present a greater demand for physical oceanographers for employment than for men trained in any of the other specialties."

It would appear from ASLO's own figures (numbers employed and mean annual rate of increase) that the demand for physical oceanographers is no greater than the demand in some of the other disciplines.

During this period of expansion—perhaps the most important to the field of oceanography—a unified front is a necessity, and any discourse favoring a given oceanographic discipline above another will only impede the progress of marine science.

BERNARD EINAR SKUD

Biological Laboratory
U. S. Bureau of Commercial Fisheries
Galveston, Texas

ECOLOGY OF INLAND WATERS AND ESTUARIES. *By George K. Reid. Reinhold Publishing Corp., New York. 1961. 375 pp., 112 figs., 14 tables. $9.00.*

Here is a textbook which presents a concise and yet comprehensive introduction to the present state of knowledge of the geological, physical, chemical, and biological processes operating in inland and estuarine waters. With the rapidly developing separation of estuarine ecology from marine ecology (oceanography), Dr. Reid's contribution is timely and particularly noteworthy in presenting comparisons between fresh, inland, and estuarine waters. In the past, comparisons between estuarine and marine waters have been the rule, with emphasis on the more marine spectrum of the estuary at the expense of the fresh-water spectrum.

The organization of the book is in five parts: Part I, The Origin and Features of Basins and Channels, with a chapter on lakes, streams, and estuaries, respectively; Part II, The Nature of Water (one chapter); Part III, Natural Waters as Environment, including a chapter each on light, temperatures, water movements, dissolved gases, and dissolved solids; Part IV, Organisms in the Environment, including a chapter on protists and plants, and one on the animals in aquatic environments; and Part V, Relationships of Organisms and Environment, with a chapter on aquatic populations and a chapter on aquatic communities.

Parts I and III follow the classic scheme of presentation used in most texts on limnology, differing mostly by the addition of discussions concerning streams and estuaries. Of the approximate 185 pages in these two parts, about 45 pages concern streams (mostly a discussion of channel forms and characteristics), and 30 pages pertain directly to estuaries. Naturally, many of the basic principles, discussed in relation to lakes, apply directly to streams and estuaries, thus accounting for the disproportion in pagination. Unfortunately, separating the discussions of various environmental factors for three types of waters causes repetition and confusion which might have been avoided. However, a careful re-reading will quickly eliminate the slight confusion.

The second and fourth parts are straightforward.

The last two chapters on populations and community in the aquatic environment represent the *Ecology* in the title. In these chapters Dr. Reid develops the principles of population and community ecology in an integrated approach. The concepts of the aquatic community appear, to this reviewer, to follow the approach of W. C. Allee, to whom the book is, in part, dedicated. Most of the terms and concepts presented in this section can be found in Allee's publications.

The bibliography of 16 pages represents most of the important publications in the aquatic sciences including many recently published works. Unfortunately, the post-war works on estuaries in Australia, South Africa, and Asia have not been cited. The two chapters of Part IV each have a short bibliography.

The book is noticeably free of typographical errors (one error on page 159, line 7, ". . . 0.0000001 of hydrogen mole/ions. . . ." should be ". . . 0.0000001 mole of hydrogen ions. . . ."), attractively bound, and of a convenient size. It should prove a useful addition to the libraries of aquatic biologists.

ANTHONY INGLIS

Biological Laboratory
U. S. Bureau of Commercial Fisheries
Galveston, Texas

FRESHWATER FISHES IN MISSISSIPPI. *By Fannye A. Cook. Mississippi Game and Fish Commission, Jackson, Miss. 1959. 239 pp., 40 figs., 4 tables, 2 maps. $3.00.*

The review in Copeia, 1960, No. 4, by Milton B. Trautman, gives the details of arrangement of subject matter, and so this review will be devoted to pointing out errors and omissions.

In the Preface, Dr. Karl F. Lagler is credited with identifying a number of specimens of *Hybopsis*. This apparently is an error in acknowledgment and Dr. Ernest A. Lachner should be the person thanked. The latter is given some acknowledgment on page 128.

There are a number of typographical errors, *e.g.*, page 43, line 16, "eggs hatch *in* larval forms"; p. 55, l. 18, *L. platostemus* should read *L. platostomus*; p. 57, l. 38, *chasii*, other places this specific name is *chaseii* which is the way Wailes spelled it; p. 91, last line of key, *Opsopoedus* should be *Opsopoeodus*; p. 170, couplet 5 of key *Lepomis cynellus* should be *Lepomis cyanellus*; p. 211, l. 22, "both lakes *ad* streams"; etc. These are some of the errors that were noticed by a hurried scanning of the publication. The misspelled technical names are the more serious mistakes, but fortunately there are only a few.

On page 43 the author says, "suctorial mouth without functional jaws." This could be interpreted as meaning lampreys have jaws but that they are nonfunctional; I suggest deletion of the word, functional.

The author states in the general discussion of lampreys on page 43 that the ammocoetes live in the mud of quiet backwaters. I disagree because ammocoetes almost invariably live in silt pockets or bars behind (downstream from) logs and rocks in the channel or along the margins of the channel downstream from bank projections, debris, logs, etc. The "pockets" of silt are a result of eddy currents, and presumably the same currents bring food material within reach of the filter-feeding ammocoetes.

Unfortunately the section on garfishes was not edited carefully. There are numerous errors and perpetuations of fishermen's yarns. The key on page 54 gives the lateral line scale count of 59 to 64 for *Lepisosteus platostomus* which is correct, but then on page 58, the 14 specimens (thought to be *L. platostomus*) from the Pearl River have a scale count ranging from 53–56, and on page 63 in Table I, the three specimens of shortnose gar have 53, 55, and 56 lateral line scales. Obviously the latter counts (14 specimens from the Pearl River and the three referred to in Table I) are those of the spotted gar. Actually there are no authenticated records of *L. platostomus* from the Pearl River, and my collecting during the past 12 years has not revealed any.

The name *Lepisosteus oculatus* Winchell, 1864, should be used instead of *L. productus* Cope, 1865. I have not had the opportunity to hunt for Wailes' specimen of *L. chaseii*. Apparently the mounted specimen was part of a private collection which probably no longer exists. The published description is inadequate for species determination, and so unless the specimen is found, the name *L. chaseii* cannot be recognized nor can it be correctly referred to the synonymy of any particular species. Of course, if the specimen is found and is a spotted gar, then the name *L. chaseii* could replace *L. oculatus*.

The longnose gar, *Lepisosteus osseus*, is an inhabitant of rivers as well as of lakes. They usually occur in the current in the main channel, and I would debate that they *prefer* quiet water.

Spotted gar 7 or 8 feet in length and a weight of over 300 pounds (page 57) is preposterous. Is the author speaking for herself when she says, "It is believed . . . ." (p. 57, l. 6)? Then too, whom is the author referring to on p. 57, l. 24, when she says, "It is claimed by some that the shortnose gar, *L. platostomus*, reaches a maximum length of only 2 to 3 ft." Also in the same paragraph, reference to an